AN ANALYSIS OF IMPROVING U.S. ARMY ORGANIC INDUSTRIAL BASE DEPOT COST AND EFFICIENCY

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AN ANALYSIS OF IMPROVING U.S. ARMY ORGANIC INDUSTRIAL BASE DEPOT COST AND EFFICIENCY

June 2019

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Department of the Army Tank Automotive Command (TACOM) depots have been in existence since the 1940s. They are a vital piece of the nation's defense strategy, providing assurance that Army ground combat and combat support equipment can be maintained and ready for war. The depots are legally required to ensure that this capability is not lost. The cost structure that the Army depots operate under is based on a combination of funding to include overhead, direct labor and various other costs. We examined how depot costs are structured and how the costs are applied across the depot spectrum. Many depot customers have the impression that the funding structure is not set up equitably, and that they could get better value by going to the original equipment manufacturers or other vendors for their depot needs. Based on the findings of this research, we conclude that by separately funding garrison operations, the true cost can be managed more efficiently and depot customers would see a reduction in costs to their programs. To test our conclusions further, we recommend this be initiated at one of the Army's depots and the results be analyzed.

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ABSTRACT

Department of the Army Tank Automotive Command (TACOM) depots have been in existence since the 1940s. They are a vital piece of the nation's defense strategy, providing assurance that Army ground combat and combat support equipment can be maintained and ready for war. The depots are legally required to ensure that this capability is not lost. The cost structure that the Army depots operate under is based on a combination of funding to include overhead, direct labor and various other costs. We examined how depot costs are structured and how the costs are applied across the depot spectrum. Many depot customers have the impression that the funding structure is not set up equitably, and that they could get better value by going to the original equipment manufacturers or other vendors for their depot needs. Based on the findings of this research, we conclude that by separately funding garrison operations, the true cost can be managed more efficiently and depot customers would see a reduction in costs to their programs. To test our conclusions further, we recommend this be initiated at one of the Army's depots and the results be analyzed.

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TABLE OF CONTENTS

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LIST OF FIGURES

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LIST OF TABLES

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LIST OF ACRONYMS AND ABBREVIATIONS

AMC	Army Materiel Command
ANAD	Anniston Army Depot
AOIB	Army Organic Industrial Base
AOR	Accumulated Operating Results
ATL	Acquisition, Technology and Logistics
AWF	Acquisition Workforce
AWCF	Army Working Capital Funds
BBL	Better Buying Power
CBO	Congressional Budget Office
CHSENG	Chief Systems Engineer
CSEP	Certified Systems Engineering Professional
DACM	Director of Acquisition Career Management
DAG	*Defense Acquisition Guidebook*
DASD	Deputy Assistant Secretary of Defense
DASN	Deputy Assistant Secretary of the Navy
DLH	Direct Labor Hour(s)
DoD	Department of Defense
DSB	Defense Science Board
FAR	Federal Acquisition Regulation
G&A	General and Administrative
GOCO	Government-Owned/Contractor-Operated

IMCOM	Installation Management Command
JON	Job Order Number
NOR	Net Operation Results
ODC	Other Direct Costs
OEM	Original Equipment Manufacturer
OIB	Organic Industrial Base
OPM	Office of Personnel Management
OSD	Office of the Secretary of Defense
PM	Program Manager
PMO	Program Management Office
PSE	Program Systems Engineering
RRAD	Red River Army Depot
RDT&E	Research, Development, Test & Evaluation
S&T	Science and Technology
SE	Systems Engineering
SecDef	Secretary of Defense
SMC	Subordinate Major Command
TACOM	Tank Automotive Command
TLCM	Total Life Cycle Management
USAFMSA	U.S. Army Force Management Support Agency
USD (A)	Undersecretary of Defense, Acquisition
USD (AT&L)	Undersecretary of Defense, Acquisition, Technology and Logistics

WCF	Working Capital Funds

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I. INTRODUCTION AND LITERATURE REVIEW

A. ARMY DEPOTS

The role that Army depots play in supporting the readiness of the forces has long been debated. The Army has built a massive depot system over the years to ensure that repair and maintenance to weapon systems would be available in times of national emergencies (Grier, 1994, p. 66). The Army depots fall under the command of the Army Materiel Command (AMC), and its Major Subordinate Commands (MSC) and are funded primarily from the Army Working Capital Fund (AWCF). There are many challenges that the Army faces in maintaining depot capabilities. Fluctuations in funding and work load make it difficult to predict future requirements and have a significant impact "in determining staffing requirements, improving efficiency and cost effectiveness of its industrial activities in order to maintain essential capabilities" (Warren, 1998, p. 6). Army maintenance depots "support the overhauls, repairs, and upgrades of nearly all of the Army's ground and air combat systems, with work classified into two major categories: end items and reparable secondary items" (Warren, 1998, p. 12).

Each of the depots have core capabilities based on their skills and facilities rather than work on a particular weapon system. In 1993, the Defense Science Board (DSB) endorsed the Pentagon's approach of retaining core capabilities at the depots. The reasoning behind this endorsement was that the Pentagon could rid itself of duplicate capabilities and force the depots to review their costs and force structure resulting in an overall cost savings (Grier, 1994, p. 67). The defined core capabilities have not decreased the struggle that the Army depots have in developing cost savings. The shrinking budget and renewed calls to downsize, privatize, or close depots add another dimension to the efforts of making the depots cost effective. There is an idea that the Army could rely only on commercial sources to provide repair and overhaul capabilities needed to support the warfighter. The reality is that "private industry maintains capacity to meet current contracts, while Army depots must be able to meet day-to-day needs and instantly surge to meet wartime demands" (Butler, 2001, p. 71). Private industry is needed to help meet vital

wartime needs, but are not capable of meeting all the Army's mission requirements on their own. As Maj Gen Richard N. Goddard, USAF (ret), stated, "Private industry is responsible to the stockholders, while depots must be responsible to the warfighters" (Butler, 2001, p 71).

B. PROGRAM MANAGEMENT OFFICE ROLES AND RESPONSIBILITIES

The Program Management Offices (PMOs) are responsible for a weapon system from inception through disposal. Part of their responsibility is ensuring the viability of the weapon systems, while maintaining the costs associated with maintenance, repair, and upgrades. The depots perform maintenance, repair, and overhaul on items that are beyond the capabilities of field maintenance activities. These higher-level maintenance functions would be cost prohibitive for the Army to maintain at the unit level. For Project Managers (PM) of weapon systems the key factors that influence their decisions are cost, schedule, and performance. However, the primary factor influencing the decision between using commercial activities versus depots is the cost of depot Direct Labor Hours (DLHs) and the impact on the overall weapon systems' budget.

The PMOs look at cost, schedule, and performance; however, a major factor influencing their decision is the legislative restrictions imposed by Congress. Under Title 10 U.S.C., Section 2466 "Limitation on the Performance of Depot-Level Maintenance of Materiel," also known as the 50/50 rule restricts the PMOs from outsourcing all of the overhaul/repair work to the commercial sector. The law specifies that

> Not more than 50 percent of the funds made available in a fiscal year to a military department or a Defense Agency for depot-level maintenance and repair workload may be used to contract for the performance by non-Federal Government personnel of such workload for the military department or the Defense Agency. (Solis, 2005, p.1)

This allocation does not specify the number of assets but the dollar value of the depot-level maintenance and repair work that must be performed by an organic entity. This restriction forces the PMOs to look for the best value for their dollar while maintaining compliance.

C. WORKING CAPITAL FUND BUDGETING

Established by Congress, Working Capital Funds (WCF) were implemented to be a more effective funding process to control the cost of a program and to account for the work that will be performed in and during the programs existence. Under the provision of Title 10 United States Code, 2208, "the Secretary of Defense may establish working capital funds to finance inventories of supplies and industrial-type activities that provide common services such as repair, manufacturing, or remanufacturing." The WCF is designed to be a

> revolving fund with a goal of breaking even by returning any monetary gains to appropriated fund customers through lower rates or collecting any monetary losses from customers through higher rates. Revolving fund prices are generally stabilized or fixed during the year of execution to protect customers from unforeseen fluctuations that would affect their ability to execute the programs approved by Congress.

The Army Working Capital Fund (AWCF) is composed of two separate types of funds. The stock fund is used to procure spare parts in volume for sale or inventory and the industrial fund provides depot maintenance, munitions and weapon systems component manufacturing and ammunition storage. Depot-level maintenance, repair and upgrade, and Army equipment reset programs restore equipment to a level of combat capability to meet the unit's future mission requirements. The Army Working Capital Fund breaks out the reset process into three separate components:

1. Replacement, which is the purchase of new equipment to replace battle losses, worn-out or obsolete equipment, and critical equipment deployed and left in theater, but needed for homeland defense, homeland security, and other critical missions;

2. Recapitalization, which is a rebuild effort that extends the equipment's useful life by returning it to a near zero-mile/zero-hour condition with either the original performance specifications or with upgraded performance specifications; and

3. Repair, which is a repair or overhaul effort that returns the equipment's condition to the Army standard. The budget incorporates depot workload assumptions associated with the Reset program consisting of Overseas Contingency Operations funding and peacetime training operations. (Department of the Army, 2014, p. 6)

Various factors influence the AWCF budget such as personnel, revenue and expenses, net and accumulated operating results, customer rates, appropriations and capital budgets. Most of the expenses for industrial operations are cost of labor and materiel consumed (Title 10, U.S.C., Sec 2466, 1988). The net and accumulated operating results measure financial performance between projected and actual outcome and are used in calculating future labor rates. The Industrial Operations group is the governing body that determines the direct labor hour rates that the customer is charged, which recovers all associated cost with both direct and overhead. By stabilizing rates, the customers are protected from price swings that would otherwise occur during the year of program execution. The "AWCF activities develop and maintain operational capabilities by acquiring or replacing production equipment, executing minor construction projects, and developing software" (Department of the Army, 2014, p.14). These factors influence the burdened labor rate that the depots charge their customers.

D. OVERHEAD COSTS ASSOCIATED WITH DEPOT MAINTENANCE

The depots are organized under the Army Materiel Command (AMC) and its Major Subordinate Commands (MSC) structure. Forecasting future workload is difficult with changing operational tempo and fluctuating fiscal year budgets. However, AMC and its SMCs must set the appropriate rates to recover costs and sustain underutilized depot capabilities. The costs associated with supporting the larger than needed infrastructure supporting the identified workload is then passed on to the customer.

In most cases, the budgeted PM workload can be absorbed by the available depot capacity. Depot capacity is based on a one-shift, 8-hours, 5 days-a-week operation utilizing the available facilities, equipment, trained personnel, and workstation constraints required to perform the planned workload. The supported workload may exceed the program budget available from the PM due to overhead costs the depots have to recoup to maintain an operational capability.

Indirect or overhead costs are "those costs incurred for the general operation of the depot and are not specifically applicable to any one product line, program, or contract.

Direct costs are associated with a specific final cost objective such as a specific defense contract" (Department of the Army, 2014, p. 56). Depot-level indirect costs impact total weapon systems costs. This impact, forces PMs to make sustainment decisions to ensure weapon systems cost are kept on target. These decisions affect the depots in terms of workload and maintaining capabilities. Indirect costs are difficult to manage with no clear relationship between expenses and depot financial health like material and labor costs. These costs can be discretionary, and with careful analysis can be reduced or eliminated based on the operating conditions within the Army depot (Department of Defense, 1994, p. 63-16).

The Federal Acquisition Regulations define the elements that make up a cost objective: "The cost objective is a function, organizational subdivision, contract or other work unit for which cost data is desired." The cost objective has all cost allocated to it including indirect costs. Direct costs are easily identified as any cost that directly attributes to the final product or cost objective and can be traceable to a specific contract or work order. "Indirect costs are any cost not directly identified with a single, final cost objective, but it is identified with two or more cost objectives or an intermediate cost objective" Title 48, Chapter 99, Subchapter Part 9905, Section 9905.502-30, (a)(2)). The indirect costs can be further broken down into fixed or variable costs. Some fixed costs include machine depreciation, equipment and inventory, and in the case of the depots general facilities costs such as security and firefighting capabilities. These fixed costs are described as "costs that are established on a total-depot basis with a broad range of activities and remain unchanged within that 'relevant range' or the levels of activity over which cost relationships remain constant." Variable indirect costs are the utilities that are influenced by the time of year and the weather, or the wage differential for direct labor employees not engaged in work directly associated with a work order, such as when they are in training.

The depot work force is broken into direct and indirect labor. Direct labor is charged to job tasks. Indirect labor includes management, material expeditors, engineers, planners, facilities maintenance, security, and other functions that are not associated directly to a job order, but do contribute to the depot mission. The indirect labor impacts more than one cost

objective, therefore their cost is distributed over all the production runs versus one. Also "indirect labor is one of the largest cost elements in overhead" and often account for 25 percent or more of the total overhead cost (Department of the Army, 2014, p. 8). Additionally, General and Administrative (G&A) expenses represent the cost of activities necessary to the overall operation of the depot as a whole, but a direct relationship to any particular cost objective cannot be shown. Typically, G&A expenses include human resources, accounting, finance, public relations, contract administration, legal, selling, independent research and development, bid and proposal expenses, and an expense allocation from the higher headquarters such as Headquarters Management Fee.

By separating out the operational cost of running the depot from the production cost of its program lines, efficiencies in the operations can be measured and costs can be managed and controlled. The premise being that if you are given a budget to work within, management is more likely to do a better job of planning and decision-making. When managers pass cost on to their customers, they are not held accountable for those decisions; the oversight is not there. Working under a fixed budget will provide a forcing function for management to look at consolidating processes and capabilities, instead of passing costs on to programs to provide a capability just for that particular program. The industrial processes and capabilities can be more efficiently shared by better planning and execution.

E. DEFINING COSTS ASSOCIATED WITH THE BURDENED LABOR RATE

The burdened labor rate is the composite of all costs directly and indirectly associated with production of a weapon system, and many of these costs are not readily apparent. The direct costs are aligned with direct labor or "touch labor" and direct material costs which are tied directly to the end product. The indirect "costs have two components: production overhead and G&A costs, which account for approximately 40 to 45 percent of the total expenditures for organic depot maintenance" (Department of Defense, n.d.). These costs include depreciation, indirect labor such as supervisors, planners, equipment and facilities maintenance, engineering, and utilities. The Army separates depot production overhead into two separate categories: shop indirect and shop support. Shop indirect costs

are costs that occur within a work center (shop supervisor's labor) that are not directly related to the components that are being repaired in the work center. Shop support costs are indirect costs that occur within the production division but above the individual direct work centers. The "Army system uses the same shop support overhead rate for all work centers within a production division" (Glass, Margolis, & Wallis, 1994, p. 2-4). Within the indirect costs, there is indirect material. This material cannot be easily identified with the end product without difficulty or undue cost, but is needed to complete the end product.

The Army has included in the burdened labor rate General and Administrative (G&A) overhead, which are indirect depot costs that provide benefit to all production activities on the depot. The Army uses actual labor hours and also considers utility expenses as a G&A expense, and allocates the overhead charge to each Job Order Number (JON) on the basis of the budgeted rate (Glass, Margolis, & Wallis, 1994, p. 2-5). An operations overhead rate is developed by pooling all "costs incurred by the cost center plus the allocated share of the operational support costs of departments or service centers" (Miller & Vollmann, 1985, sec. 2). This allocation includes quality assurance (QA), calibration of equipment used by the depot maintenance that benefits two or more programs and machine setup costs (Department of Defense, 1994, p. 63-18). By doing this, the Army's depots are able to project their workload in direct-labor hours and overhead to develop their overhead rates for the year of execution. This burdened labor rate changes from year to year based on the difference "between the actual overhead costs incurred and the overhead costs charged" (Department of Defense, 1994, p. 63-17).

F. OTHER DEPOT ISSUES IMPACTING COSTS

Garrison functions are normally borne by IMCOM, but DEPOT installations are explicitly excluded. The costs of fire protection, security, grounds and facilities maintenance, wastewater treatment and other IMCOM responsibilities are added to the burdened labor rates since in most cases the depots are the primary tenants on the installation. Most installation function costs are stable from year to year with adjustments for inflation; however, depot workloads fluctuate from fiscal year to fiscal year based on

warfighter needs, and budgets. This creates an unstable burdened labor rate that affects the buying power of the budget available to the PMs for weapon systems depot programs.

Fluctuations in depot workload based on warfighter needs affect the depot's ability to maintain their core capabilities. The programmed workload may not meet minimum core requirement sustainability; however, the workforce must maintain critical skills therefore the depot has to add their costs to the burdened labor rate. There are three general approaches that industry has taken to manage overhead costs effectively: "(1) analyzing which transactions are necessary and improving the methods used to carry them out, (2) increasing the stability of operations, and (3) relying on automation and systems integration. Of the three, U.S. manufacturers seem most enamored of the last" (Miller & Vollmann, 1985, sec. 4)

A logical approach for improving capabilities, reducing costs, and increasing stability at the depots would be to right-size to meet a set of criteria. However, this approach violates statutes established by Congress to ensure a viable organic industrial base. Another approach to maintain existing critical and core capabilities is to automate the processes. With automation, the majority of the management comes from ensuring the correct machines and processes are available to support the projected workload. The limitation is the inconsistent nature of depot workload from fiscal year to fiscal year as well as un-programmed workload. These limitations create the need for human intervention in terms of engineering support and touch labor, creating the potential of increased overhead costs.

Depots were designed to favor effectiveness over efficiency, but declining budgets force a more equitable balance between the two, at time sub-optimizing both. This inherent inefficiency coupled with difficulty in finding candidates to backfill critical skills has resulted in the depot's business cost rising. The depots also struggle to maintain their existing capabilities to posturing themselves for the future. It is difficult to find the right balance between sustainment and mobilization capability supporting the warfighter now and in the future without increasing costs.

Within the government, competing needs have resulted in shrinking budgets. The need to sustain depot capabilities has offset the ability to fund research and development,

procure new weapon systems and upgrade existing weapon systems, which, in turn, undercuts the industrial base. This, in turn, threatens the depots' ability to sustain capabilities needed to effectively support surge capabilities. The smaller budget forces the services to upgrade existing weapons systems to maintain their lethality in the current as well as future battlefield. These upgrades increase depot maintenance time, which influences the amount of direct and indirect labor hours needed for the weapon system's repair or overhaul. The costs associated with taking a weapon system programmed for overhaul and upgrade and processing it through the depot resulting in increased lethality and capability has created an increase in costs.

Finally, one of the biggest challenges facing the depots is the management of the Working Capital Fund (WCF). The WCF rates are set so that "the activity's costs such as payroll, supplies, contracts, equipment, inventory, depreciation, and maintenance are recovered, there is sufficient cash on hand to cover operating disbursements, and it should break even over time" (Hinton, 1997, p. 6). The issue is that over time the WCF has not been able to operate on a break-even basis. Factors contributing to this failure have been the impact of "cost-effectiveness of depot maintenance operations, including inventory management practices, repair process, and readiness requirements" (Hinton, 1997, p. 7). Couple this with the materiel cost increase and the depot maintenance capital fund tends to generate losses. These issues reduce the buying power the military services have available through the O&M funds. What makes managing the WCF so difficult is that the business areas must develop and project their stabilized prices two years before they go into effect. This price estimation is based on customer input, identification of labor, material, and other costs. Any increase or reduction in any of the inputs creates a delta, which then impacts the breakeven projection.

Furthermore, with excess capacity in both the organic and private industrial repair and overhaul capability, inefficiencies are created which further skew the breakeven projection. The organic depot mission supports the military customers' programs and is designed to support surges, which creates some inherent inefficiencies. Some of the inefficiencies are due to the uncertainty of repair requirements and the necessity for the

depots to maintain capabilities for items that may be obsolete or have a low fleet level (Hinton, 1997, p. 33). These factors further exasperate the cost of doing business at the depots making it difficult for the depots to compete with their commercial counterparts.

In looking at the challenges that all of the factors influencing the depots cost, the challenge becomes trying to find a way to make the depots cost structure similar to their commercial counterparts. Because the depots are a government entity, they are not allowed to make a profit like the private sector is; however, they can look at ways of creating efficiencies that would make them competitive in terms of cost. In looking at the various factors influencing the costs associated with burdened labor rate of the depots, consideration should be given to centrally funding the activities that are not associated with the production of end products but are associated with the functions that are inherently IMCOM centered. The question becomes this: Will centrally funding the IMCOM functions provide the necessary relief to provide the depots the competitive edge they need?

II. DATA, ANALYSIS AND FISCAL RESPONSIBILITY

A. DATA INFORMATION AND ANALYSIS

The Army Working Capital Fund (AWCF) budgets from FY2013 through 2015 indicate that civilian end strengths in the industrial operations decreased by 133 positions, while the military end strength remained stable. During the same period of time, revenue dropped by $409.9M and expenses also declined by $671.9M (Department of Defense, 2015). During the same period, the hourly rate increased by $11.86 per hour or an 8.72% increase over three fiscal years. The depots have not received any direct appropriations to offset costs that could impact customer cost. The depots recoup their depreciation expenses for capital projects through the rates they charge the customers. The Industrial Operations' capital budget from FY2013 through FY2015 totaled $442.7M and is depreciated at the rate of 9.71 percent over 17 years (Department of Defense, 2015).

The AWCF budget estimate for FY2015 was submitted to Congress in March 2014. The budget estimated provided the Net Operation Results (NOR) and the Accumulated Operating Results (AOR) of the Industrial base. These financial measures provide the activities' gains and losses within a single fiscal year while measuring how close to the budget the activities are performing (Department of the Army, 2014, p. 43). The differences are used to calculate the future years' burdened labor rate. Activities will charge the customers to ensure the AWCF operates as close to a balanced fund as it was intended. With this information the working groups within the Organic Industrial base are able to breakdown costs associated with the burdened labor rate and establish the rate that the customer is charged.

The U.S. Army Force Management Support Agency's Force Management System website provided a breakdown of the subject depots workforce make up. This information was used to identify workforce alignment between production and installation positions. The labor cost analysis uses step 5 pay rate for the General Schedule (GS) employees and the Wage Grade (WG) employees. This provided a labor cost estimate for both installations. This information coupled with information extracted from the Office of the

Undersecretary of Defense (Comptroller) March 2014 Operations and Maintenance Overview of the FY2015 Budget Estimates gives a baseline for determining the effect of centrally funding garrison type functions at the two depots.

The hypothesis is that by separately funding the depot's garrison functions and removing these associated costs from the burdened labor rate the customer will benefit sufficiently to warrant implementation. To test this hypothesis, the cost data was extracted from the 2001 and 2005 budgets and separated into base operation and mission functions. This gave a percentage of the budgets dedicated to base operations and mission functions. With this percentage breakdown, the analysis of the 2015 budget and burdened labor rates could be analyzed providing a comparison of burdened labor rates with and without the base operations labor included. The resulting data provides a reasonable trend assumption on the burdened labor rate projections, providing a basis for determining the value of centrally funding garrison functions and the benefit to the customer in terms of reduced burdened labor rate.

The Congressional Budget Office (CBO) publishes the "Models Used by the Military Services to Develop Budget for Activities Associated with Operational Readiness." The information in this publication provides a breakdown of depot maintenance funding requirements by land forces. The use of the CBO's model and using the FY2015 budget proposal allowed for the validation of the overall costs for the depot maintenance projects. This information provides the basis for determining the potential cost saving of centrally funding the garrison functions.

The Department of Defense defines indirect costs as "costs incurred for the general operation of the business and are not specifically applicable to any one product line, program, or contract" (Cash, 2001, p. 1-2). It further defines it as being associated with a "specific final cost objective" (Cash, 2001, p. 1-2). Indirect cost make up a significant portion of the weapon systems' costs and tend to be discretionary in nature and subject to reduction or elimination. Depot indirect costs affect the buying power of the customer and there must be a willingness on the part of the Army to reduce the burdened labor rate to include centrally funding IMCOM related functions.

Defining cost functions, direct and indirect costs associated with depot activities helps to understand the associated cost objectives. The difficulty is classifying the costs appropriately. The Federal Acquisition Regulations (FARs) clarify the cost objectives, direct cost, and indirect cost. FAR 31.001, "defines a cost objective as a function, organizational subdivision, contract or other work unit for which cost data are derived and for which provisions are made to accumulate and measure the costs of processes, products, jobs, capitalized projects, etc." A final cost objective has both direct and indirect costs allocated to it (Cash, 2001, p. 2-1).

FAR 31.202 defines direct cost as "any cost that can be identified specifically with a particular final cost objective." Direct costs include material costs directly associated with the product and used in making it. Labor associated with direct cost is not limited to touch labor it can also include those tasks easily associated with the end product such as direct engineering. Direct costs are further complicated by adding costs that are not material or labor but do have properties that may not be a physical or visual part of the completed product, these are referred to as Other Direct Costs (ODC).

OMB Circular A-122 (CFR Part 230) defines an indirect cost, as "costs that have been incurred for common or joint objectives and cannot be readily identified with a particular final cost objective." At the depot level, the indirect cost is broken down into product related operational indirect and garrison indirect. Production related indirect costs "include salaries of supervisors, foremen, and other indirect employees, non-productive time of direct employees, and fringe benefits" as well as other costs (Cash, 2001, p. 2-3). Indirect costs can be fixed which are relatively constant and tend to relate to capacity, but include building and machinery depreciation. Other overhead pool cost include administration, tool cribs, machine maintenance, supervision, lubricants, consumables and cleaning supplies that are not readily identified to one product line and must be spread over all work load. The basic formula for all indirect cost rate is:

$$\text{Rate} = \text{Indirect Cost Pool Expenses} / \text{Allocation Base}$$

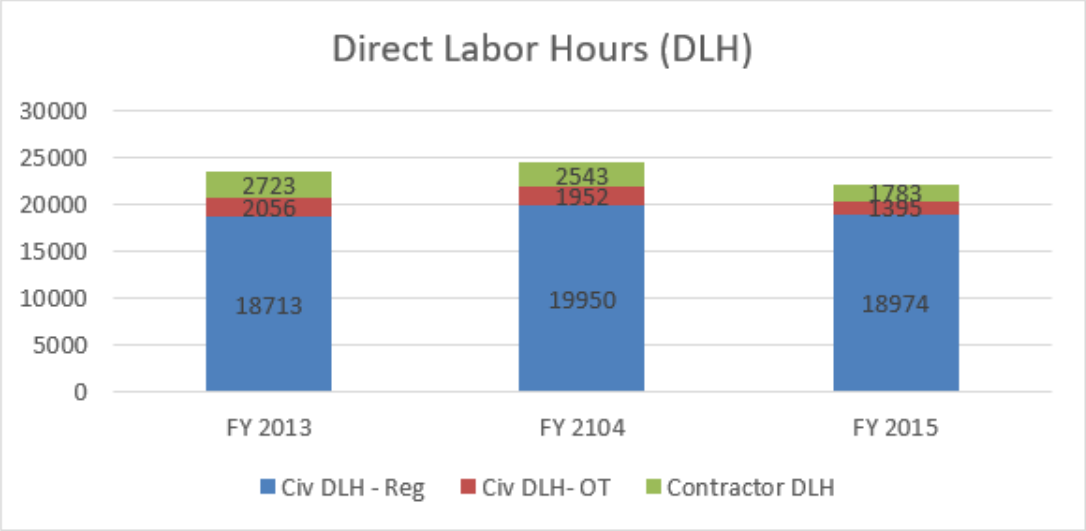
The allocation base is defined as the number of direct labor hours available or estimated for a contract or program. The depots consider one man-year as 1615 hours for direct labor and 465 hours as indirect costs associated with production. The garrison costs are all indirect and for the purpose of the burdened labor rate are calculated at 2080 hours per one man-year. The garrison costs including labor, equipment lease, depreciation, maintenance, and material cost are incorporated into the burdened labor rate as Base Operating Cost (BOC).

The Army bases the burdened labor rate for non-supply management activity groups including depot maintenance on "identified output measures or representative outputs. The output measures establish fully burdened rates per output, such as cost per direct labor hour, cost per product, cost per item shipped, etc." (GAO/T-NSIAD/AIMD-97-152, 1997). The depot defines that burdened labor rate using the same process. The depots take the various Program Management Offices fiscal year requirements for overhaul, repair, or recapitalization, look at available man-hours and projected previous fiscal year carryover to determine the burdened labor rate.

The burdened labor rate changes each fiscal year. The reason for the change is based on the AWCF's principle of a zero-balance target. When the depots costs exceed the projects, the next fiscal year the burdened labor rate will be increased to bring the balance back to zero. Conversely, if the burdened labor rate charged generates a surplus, the next fiscal year will have a reduced burdened labor rate.

The Army's projected decrease in direct labor hours for FY2015 did not occur, but remained relatively high to complete the work carried over from previous fiscal years. From FY 2013 to FY 2015 the Army's Industrial Operations DLH for DA civilians increased from 18.71M DLHs to 18.94 DLHs (Table 1), while overtime was reduce from 2.06M to 1.40M and contractor DLHs when from 2.72M to 1.78M resulting in an overall reduction of 2.43M DLHs (GAO/T-NSIAD/AIMD-97-152, 1997).

Table 1. Direct Labor Hours

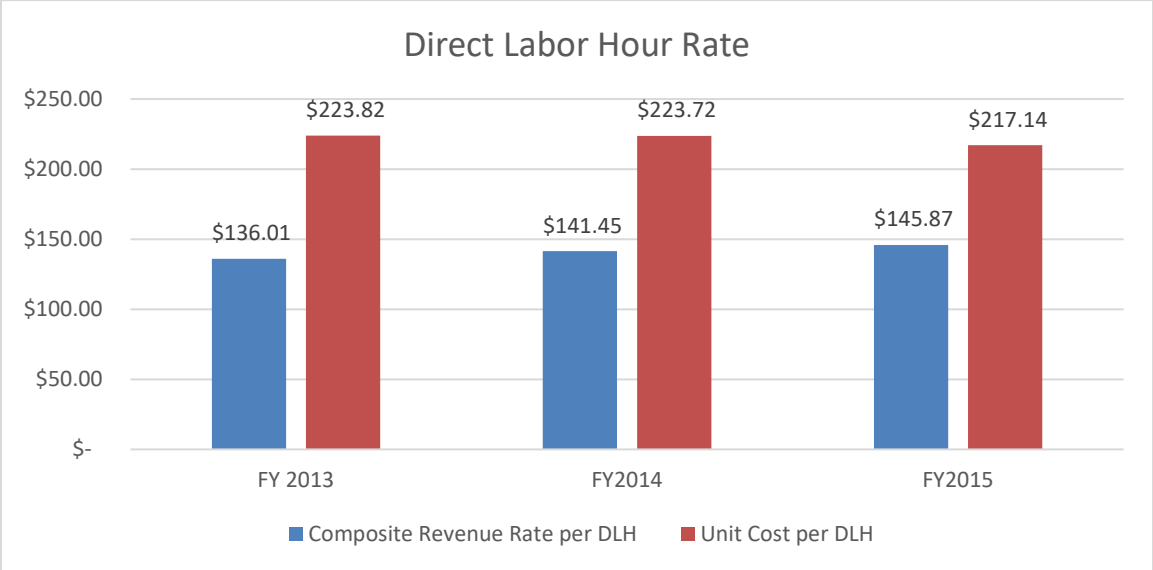


	FY 2013	FY 2104	FY 2015
Civ DLH - Reg	18713	19950	18974
Civ DLH- OT	2056	1952	1395
Contractor DLH	2723	2543	1783
Total DLH	23492	24445	22152

The "stabilized workload is comprised of direct labor, material costs, and overhead costs (mission indirect and non-mission indirect costs) and accumulated operating result adjustments that are designed to return gains and recover losses" (Department of the Army, 2014, p. 55). In the case of the FY 2015 budget, the composite revenue rate was set at $145.87 per man hour and projected to

> return $102.3 million of prior year accumulated operating results (AOR). But unlike the composite revenue rate, which is adjusted for the AOR and applied to only new rate stabilized workload, the unit cost per direct labor hour represents total cost of work performed on both prior year and current year orders. The return of operating gains to the customers causes the revenue rate to be lower than unit cost. (Department of the Army, 2014, p. 56)

Table 2. Direct Labor Hour Rate



	FY 2013	FY2014	FY2015
Composite Revenue Rate per DLH	$136.01	$141.45	$145.87
Unit Cost per DLH	$223.82	$223.72	$217.14
Revenue Rate Change		3.85%	3.03%

The "Industrial Operations revenue amount represents earnings from work performed on customer equipment. Total expenses cover full costs, including material, labor, storage, and other direct or indirect costs associated with the product being provided. In FY2015, the revenue and expense projections decreased due to declining workload." (Department of the Army, 2014, p. 56).

Overhead rates and standard costs "should not be confused with stabilized billing rates. These are used solely to price work to DoD-funded customers and may only be changed upon approval of the office of the Comptroller of the Department of Defense. All indirect costs shall be allocated to job orders by the use of an operations overhead rate and a G&A rate" (Hazelton, 2016, p. 1). The overhead rate is determined for every cost center that performs direct labor in accomplishing depot maintenance.

The working capital funds concept has "not accomplished the goal of operating on a break-even basis. As a result, to ensure that cash balances remain positive, the funds advance bill their customers" (Hazelton, 2016, p. 1). There are several factors influencing depot maintenance including excess capacity, material costs increases, and reductions in military purchasing power through the operations and maintenance funds, and the cost of maintaining an aging infrastructure within the depots themselves. The two depots that were analyzed in this study were both stood up in the early 1940s to support World War II efforts. Even with upgrades through the years, the cost of sustaining the older facilities and infrastructure require more time and effort to maintain. Other factors that have influenced the "cost-effectiveness of depot maintenance operations include inventory management practices, repair processes, and readiness requirements" (Hinton, 1997, p. 5). These costs have to be passed on to the customer; however, centrally, funding garrison functions has the potential of reducing the burdened labor rate charged to the customer. By removing the costs of garrison operations from the burdened labor rate, it would force the depots to look at their processes and initiate ways to more effectively complement the dynamics of the depot operations while reducing the costs to the customer.

Future fiscal year WCF prices are established based on the projected outcomes of the current fiscal year with the intent of creating a zero balance. It is difficult to accurately predict the costs associated with materiel expenditures and the stability of the program workloads. The workload fluctuation based on the warfighter needs and available budget. This instability translates into a burdened labor rate that changes from year to year, which in turn influences PM decisions. Central funding of the garrison functions will eliminate one cost that can adversely impact the WCF pricing strategy. Even though garrison functions tend to be fairly constant from year to year, elimination of that part of the burdened labor rate will allow the depot to focus on improving direct and indirect labor functions influencing the burdened labor rate. This reduction would give the depot operations the opportunity to focus on the elements of production related direct and indirect labor that would support a burdened labor rate that generates sufficient revenues to recover expenses associated with the repair/overhaul operations capturing the intent of the break-even WCF.

The two depots that were studied are not managed by IMCOM, but the garrison functions come under the jurisdiction of the depot commander. This means that all of the garrison costs are allocated to the programmed workload as part of the burdened labor rate. Garrison costs are all indirect costs that include labor, facilities and infrastructure maintenance, and support equipment depreciation. TACOM LCMC Organic Industrial Base (OIB) breaks down the burdened labor rate into the following categories, Direct Labor; Direct Materials; Direct Other; Mission Indirect (Within Shop and Above Shop): BOC (Base Operating Costs): and G&A which is then totaled and adjusted with a surcharge produce the stabilized rate for the installation (Hazelton, 2016, p. 1). Table 3 shows the breakdown of Anniston's and Red River's burdened labor rate for fiscal years 2015 through 2017.

Table 3. Burdened Labor Rate Breakdown by Installation for Fiscal Years 2015 through 2017

ANAD	Direct Labor	Direct Materials	Direct Other	Mission Indirect	BOC *	G&A	Total	Surcharge	Stabilized Rate
FY15	$36.97	$79.94	$0.36	$50.68	$25.12	$0.00	$193.07	($22.80)	$170.27
FY16	$40.90	$65.14	$0.77	$55.72	$31.49	$0.00	$194.02	($28.00)	$166.03
FY17	$39.21	$68.77	$2.84	$51.55	$30.10	$0.00	$192.47	($22.20)	$170.27
RRAD	**Direct Labor**	**Direct Materials**	**Direct Other**	**Mission Indirect**	**BOC**	**G&A**	**Total**	**Surcharge**	**Stabilized Rate**
FY15	$43.52	$42.37	$3.19	$45.79	$32.15	$0.00	$167.02	($1.14)	$165.88
FY16	$40.35	$37.40	$13.21	$42.04	$32.92	$6.16	$172.08	$0.00	$172.08
FY17	$44.20	$41.97	$10.81	$41.32	$38.36	$0.00	$176.66	($6.24)	$170.42

The mission indirect at Anniston was broken down further to "Within Shop" and "Above Shop" which averaged out of the three years to be 26.31 percent Within Shop and 73.69 percent "Above Shop." Taking the above shop cost and adding in the BOC and the G&A costs the garrison costs were calculated for each of the fiscal years and allows for an estimate of what portion of the burdened labor rate is considered garrison oriented. Based on the average cost distribution over the three fiscal years, the garrison overhead is 42.21 percent of the total cost for Anniston's burdened labor rate and 46.29 percent for Red River.

Both Anniston Army Depot and Red River Army Depot are manned similarly while ANAD's workforce is larger overall. They have direct labor, indirect labor production related and indirect labor garrison focused. Table 4 gives the workforce breakdown for both installations.

Table 4. Workforce Breakdown of Depot Labor. Adapted from AMC (2017).

Installation	Total Personnel	Production Direct Labor (D/L)	Percentage Production D/L	Production Indirect Labor (ID/L)	Percentage Production ID/L	Garrison Labor	Percentage Garrison Labor
ANAD	2586	1350	52.20%	670	25.19%	566	21.89%
RRAD	1956	947	48.42%	506	25.87%	503	25.72%

The percentage of the total workforce that is involved in garrison activities is 21.89% for ANAD and 25.72% for RRAD while overall labor for production or production related activities makes up 78.11% and 74.79%, respectively. In order to understand the differences in percentage between ANAD and RRAD garrison labor, their garrison work force has to be broken down by functions.

B. BUDGETING AND FIDUCIARY RESPONSIBILITY

By separating the garrisons operation cost from the customers overhead cost, it will give the depot managers direct responsibility and accountability for allocating those funds to best meet competing requirements. This will provide greater visibility of how those funds were used, thus driving efficiency into the process. With depot managers being held as the fiduciary owner, it will help ensure that the focus of public sector budgeting should be to obtain the best value for the agency and the taxpayers.

Financial management of Army depots is similar to financial management of commercial companies in many respects. However, there are key differences that change the focus of depot managers. A for profit business focuses on profits and maximizing value. Whereas, an Army depot's primary goal is to provide a function needed to sustain essential

Army equipment. As an Army depot is essentially a not-for-profit organization, and its funding is earmarked for specific programs, it lacks financial flexibility and is dependent on resources provided by the DoD budget as determined by Congress. The funding resources provided come from portions of the budget, and are directed towards providing set funding amounts to specific programs. Thus, the depots must demonstrate their stewardship of the funding allocated for these specific programs, and those dollars must be used for that purpose and not be diverted to cover other cost/programs. The management and reporting activities of the depots must emphasize good stewardship for all allocated funding. The depot management teams must ensure that the funding they received to operate a program is used appropriately and as directed by the Congress. Planning a budget and managing within the funding restraints of that budget, are extremely important activities for a defense organization. The depots have to be cognizant as to whether they have the funding required to meet the needs of its program customers. Funding is extremely challenging to predict, as programs are cancelled, quantities are changed or new programs are started that were not forecasted. Also, there are depot functions rely on AWCF revenue from the repair or overhaul of down parts that then are returned to the supply system. If the number of repair parts that were predicted for the year decreases, then the funding decreases accordingly. This along with other program changes make it difficult for the depots to forecast their funding requirements reliably year to year. For these reasons, getting control over all cost that are associated with operating a depot is an extremely important function.

The scope and size of a depot's programs determine the complexity of its budgets. A depot's budget comprises all the programs, plans and objectives that management foresees and implements over a fiscal year, and covers all phases of depot operations. The depots priorities and programs need to be balanced in order to operate an effective budget. The depot's management team needs to effectively utilize the capabilities it has and the available resources to provide the largest impact to as many programs that are anticipated for that fiscal year. If a depot's DLH rate changes during the fiscal year, it has to change the amount charged to their customers which may have a negative effect as cost go up or a positive effect if costs go down. The approved budget should be used by upper management

as a tool to gauge their operational performance. When management examines their budget, they should be looking at areas for improving processes and procedures in order to lower cost. Without active awareness of management at all levels, and their participation to carrying out the organizations goals, a well-planned budget is useless. Depot priorities need be established. Goals and objectives need to be clearly identified, as well as being achievable by the organization. Goals and objectives need to be measurable in order to determine if they are having the desired effect. Each organization's processes and decisions must be evaluated in order to determine their effectiveness as well. Sub-organization should be challenged to prove that they are necessary, that they provide value to the organization and they contribute to the overall depot mission.

A depot's budget should be a complete and comprehensive picture of the overall required fiscal support, and its expected expenditures for a fiscal year. Because budgets are based and allocated by fiscal year and not actual requirements, managers at all levels should be planning for the future in order to prudently utilize the funding that becomes available to them. By looking ahead, depot managers could improve their planning and control with the intention of increasing the depots efficiency. Depot managers need to find the most efficient course of action through which their efforts will optimize the goal of meeting its primary mission of supporting the Army customer. Managers that budget for the future will help ensure the depot stays on its intended path, and will focus attention on gaining efficiencies on operating procedures and plant processes.

A good budget and forecasting plan will help translate the objectives of the organization into actions that are achievable. It also helps to coordinate the various factors of production, with a view on reducing redundancy and gaining efficiencies. A good budget plan communicates to the organization the objectives being planned across the depot for that fiscal year. Performance for meeting the budget plan is the responsibility of the managers, and they should be held accountable for competitive results, not for meeting the budget. Depot leadership should challenge and coach managers, not command and control them. Leadership should provide goal setting, and milestones to gain and measure results. Strategic processes should be continuous and inclusive, not a top-down annual event.

Depot managers need to delegate, and give team leaders/workers the authority and ability to act on improvements that they may see can be attained from their area of expertise. Management should not be controlling and constrain the ideas that come from the workers ground up. Coordination between programs is essential to gain lessons learned and implement best practices. If each program is an island in and of itself, there will not be any cross coordination between organizations or interactions through process design and information systems. Resource management is paramount in a resource-constrained environment. Depot managers need to make resources available to operations when required. Lastly, depot managers should be tracking a few key measurements and controls, from all programs in order to determine what works best and what needs to be improved upon. (Bratton & Gold, 2007, p. 64).

The budgetary process effectiveness is highly dependent on the extent that both management and employees buy into the goals that were established by the depots leadership. Depots leaders should recognize this when developing their budget plan. Leadership at all levels need to establish a culture and shape behaviors that promote the depot's objectives, and stress that each organization can gain efficiencies with management and employee participation and empowerment.

III. RESEARCH FINDINGS

The data gathered in this research supports the hypothesis that the cost of centrally funding garrison related or base operations instead of passing those costs on to the customer will result in an adjustment to the funding and workload projections for depot maintenance activities. However, while the shift should result in the reduced cost associated with the burdened labor rate, the conjecture is that it will not be a one-for-one cost reduction as the current mode of funding the garrison function is to spread the cost over all of the projected workload. By implementing the change, it should allow the depots to focus in on the real costs associated with the burdened labor rate.

Our research shows that by centrally funding the garrison or installation related functions at ANAD and RRAD the adverse impact to the burdened labor rate will be eliminated. By looking at the cost of maintaining the installation as a fixed cost to the Army this should allow labor costs to remain fairly constant and provide marketing abilities for the depots. The same would be true of routine and preventative maintenance activities associated with the day-to-day operations of an installation. With these changes implemented the depots can focus on improving those direct and indirect labor functions that influence the burdened labor rate and in turn create a realistic budget that will generate sufficient revenues to recover expenses incurred.

The TACOM LCMC Organic Industrial Base (OIB) breaks down the burdened labor rate in the following categories, Direct Labor; Direct Materials; Direct Other; Mission Indirect (Within Shop and Above Shop); BOC (Base Operating Cost); and G & A which is then totaled and adjusted with a surcharge to produce a stabilized rate.

Figure 1 shows an example of a Depot Rate Component break out. You can see by the chart that both Mission Indirect Costs and BOC as well G&A have a negative impact on the cost structure at the Depots. In this example, the costs passed on to the DEPOT equate to 1.493M for this hypothetical recapitalization effort.

Figure 1. Depot Rate Component Breakout Example

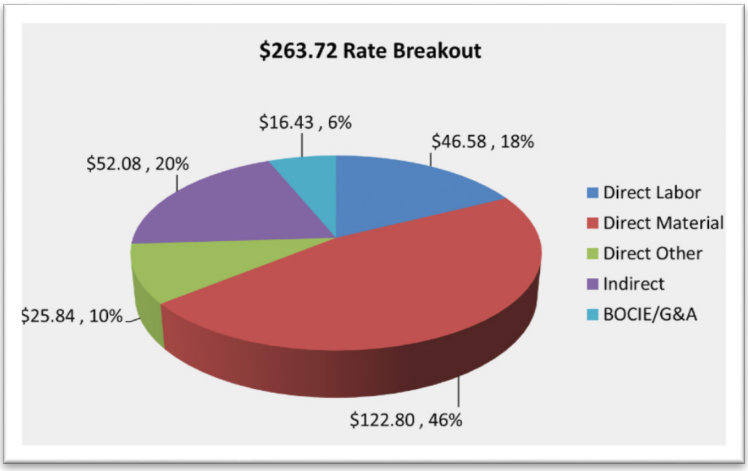
DEPOT Rate Component RECAP Example

Cost Element	Cost	Definition
Direct Labor	$1.015M	Direct & overtime costs (to include benefits) based on skills sets required
+ Direct Material	+ $2.676M	Total execution material for the program. (~1256 Items)
+ Direct Other	+ $.563M	This category typically includes direct travel, transportation, equipment and contracts.
+ Mission Indirect	+ $1.135M	All elements of indirect expense budgeted in a productive cost center, expense budgeted in all other support areas and Above Depot Expenses (i.e. Depreciation, DFAS, CHRA, IT Sustainment, CCAD Headquarters Support which includes Engineers.)
+ Base Operations Cost/General and Administrative	+ $.358M	All elements of Base Operations costs that are not funded by tenants for the support provided to them.
Total Program Expenses	**$5.747M**	The Expensing Rate includes all budgeted expenses.
± AOR Surcharge	Varies each FY	The AOR surcharge is the value per direct labor hour required to achieve a zero AOR in the budgeted year. (i.e. return prior year gains or collect prior year losses)
Total Program Costs	**$5.747M**	The sum of all actions above results in the published stabilized rate for the budgeted year.
Direct Labor Hours	21,792	The **estimated** number of hours required to perform the direct work on a customer product or to perform a billable service for the customer.
Direct Labor Hour Rate	**$263.72**	The sum of all direct labor, direct material, indirect, general and administrative expenses and AOR recovery projected to be incurred by the Activity during the budget year divided by the total number of direct labor hours.

Mission Indirect Breakout ($M)	
Labor	$0.483
Material	$0.151
Services	$0.419
Depreciation	$0.017
Other	$0.066
Total	**$1.135**

Another way to look at how these costs are broken out is by looking at the percent of total program dollars being allocated to the aforementioned accounts. Figure 2 shows that "Indirect and Direct Other" account for 26% of the costs related to the program are incidental to the program goals.

Figure 2. Percent of Rate Related to Cost Category



With this understanding, we can now relook at ANAD and RRAD rate structure and identify what the customer-stabilized rate would be if BOC and G&A were not part of the standard rate. Table 5 shows ANADs rates before the installation related activities are removed and after the BOC and G&A.

Table 5. ANAD Rates Fully Burdened versus BOC and G&A Removed

ANAD	Direct Labor	Direct Materials	Direct Other	Mission Indirect	BOC *	G&A	Total	Surcharge	Stabilized Rate
FY15	$36.97	$79.94	$0.36	$50.68	$25.12	$0.00	$193.07	($22.80)	$170.27
FY16	$40.90	$65.14	$0.77	$55.72	$31.49	$0.00	$194.02	($28.00)	$166.02
FY17	$39.21	$68.77	$2.84	$51.55	$30.10	$0.00	$192.47	($22.20)	$170.27
BOC/G&A Removed									
FY15	$36.97	$79.94	$0.36	$50.68	$0.00	$0.00	$167.95	($22.80)	$145.15
FY16	$40.90	$65.14	$0.77	$55.72	$0.00	$0.00	$162.53	($28.00)	$134.53
FY17	$39.21	$68.77	$2.84	$51.55	$0.00	$0.00	$162.37	($22.20)	$140.17

Table 6 shows RRADs rates before the installation-related activities are removed and after the BOC and G&A.

Table 6. RRAD Rates Fully Burdened versus BOC and G&A Removed

RRAD	Direct Labor	Direct Materials	Direct Other	Mission Indirect	BOC *	G&A	Total	Surcharge	Stabilized Rate
FY15	$43.52	$42.37	$3.19	$45.79	$32.15	$0.00	$167.02	($1.14)	$165.88
FY16	$40.35	$37.40	$13.21	$42.04	$32.92	$6.16	$172.08	$0.00	$172.08
FY17	$44.20	$41.97	$10.81	$41.32	$38.36	$0.00	$176.66	($6.24)	$170.42
BOC/G&A Removed									
FY15	$43.52	$42.37	$3.19	$45.79	$0.00	$0.00	$134.87	($1.14)	$133.73
FY16	$40.35	$37.40	$13.21	$42.04	$0.00	$0.00	$133.00	$0.00	$133.00
FY17	$44.20	$41.97	$10.81	$41.32	$0.00	$0.00	$138.30	($6.24)	$132.06

The research shows that ANADs average rate over the three years defined was $168.85 a burdened hour, consequently, if the garrison or infrastructure requirements is removed from the customer rates then the updated hourly rate for ANAD would have been $139.95 an hour. The change for ANAD equates to a 17% reduction. RRADs average rate over the three years identified was $169.46 and if the installation related activities were removed from their rates, the new hourly rate would on average be $132.93 or a 22% reduction in costs to the customer.

Customer costs can be further reduced if the workforce man hours related to garrison activities are removed from the burdened rate. We know the percentage of the total workforce that is involved in garrison activities is 21.89% at ANAD and 25.72% at RRAD.

The following example shows how labor rates are negatively impacting depot customer retention. Red River Army Depot provided an update cost on a FY18 TACOM reset program for U.S. Army Reserve Command and the Army National Guard. The original total cost per unit determined in FY17 was $107,022, but in February 2018, the cost per unit was updated to $160,301. The main reasons for the cost increases were; increased parts cost, from $30K to $60K per unit, increased labor hours due to parts salvaging, and increased labor rates. As a result of the per unit price increase the Army Reserve moved their FY18 program to reset 40 pieces of equipment to a commercial contractor in the Texarkana area at a per unit cost of $117,143. The Army Reserve indicated that they are using the same parts price increase as RRAD ($60K) and the same statement of work scope. It was the labor hours and rate that became the issue. The cost savings per unit being reset is $43,158, for a total cost savings to the Army Reserve of $1,726,320.

IV. CONCLUSIONS AND RECOMMENDATIONS

The focus of our research was to determine if changing the funding structure by putting the entire burden of facility maintenance and repair costs, infrastructure improvements, security, and protection on the Army's Other Maintenance Army (OMA) account from the Other Procurement Army (OPA) account would save funding for the Program Office and increase the workload for the depots. After conducting the research using TACOM's Anniston and Red River Army Depots' production capabilities and burdened labor rates to test our hypothesis, coupled with the literature reviews, we have come to the conclusion that organic depot customers would see a reduction in the hourly costs to their program, if the garrison costs were transferred from the burdened labor rate to a separately funded Installation Management funding source.

We believe that efficiencies can be gained and measured when garrison operational costs are removed from the burdened labor rate charged to the customers. The realization is that the cost of running the garrison is not being eliminated, but the money is being shifted from one line of accounting to another. By separating out the garrison operational costs from the burdened labor rate, charged efficiencies can be gained in the garrison operations as well as in production operations. The true cost of the daily operation of the garrison can be more effectively managed, and controlled through better planning and decision making.

Separating the garrison specific costs from the burdened labor rate will reduce the burdened hourly rate charged to the depot customers, but will not eliminate all indirect costs associated with the burdened labor rate. The analysis of the labor breakdown for both installations indicates that the garrison focused labor force makes up approximately 24 percent of total labor expended by the two subject depots. Taking into account not only the garrison labor but also the material costs associated with garrison operations, the savings will be passed on to the customers, giving the potential for increasing readiness by translating the budget savings into more weapon systems going into the depot maintenance program in any given fiscal year based on mission needs. Removing the overhead from the

fully burdened labor rate will certainly save money for the depot customers; howeve,r without a parallel effort to gain efficiencies within the operational side of the depot, it is simply moving the indirect costs within the Army budget. Within the depot operations, a concerted effort has to be made in identifying duplicate efforts, not only within a specific depot but also within the organic industrial base enterprise. By taking an enterprise approach, reducing duplication, and streamlining processes, the Army's Organic Industrial base will be able to pass cost savings on to their customer base and in turn improve the overall health of the organic industrial base.

Another benefit of removing the garrison operations costs from the burdened labor rates will be a better understanding of direct labor and material costs associated with depot production and those indirect production related activities that are part of the depot's production environment. The management activities from the depots, Major Subordinate Commands and Army Materiel Command will be able to see how the burdened labor rate breaks down between the direct and indirect production factors involved in the depot's production environment. This transparency of the burdened labor rate throughout the Army's Organic Industrial Base can provide opportunities to improve efficiencies by taking the best practices of the different depots to create a standard for the organic industrial base as a whole. It will also be a "forcing function" for the management of the depots to look at how this will influence schedule and performance of the depot. These efficiencies in turn can be passed on to the customers, creating a better readiness posture for the warfighter.

This separation of the garrisons operation cost from the customers overhead cost will give the depot managers direct responsibility and accountability for allocating those funds to best meet competing requirements. Providing greater visibility of how those funds are used thus driving efficiency into the process. Being able to see how program budgets are spread across direct and indirection production related functions will allow the production management team to make informed decisions that will best benefit the customers and ultimately the warfighter.

Changing the funding process for the Army's Organic Industrial Base by separating garrison costs from operational (production) costs will be a challenge, but based on our research, implementing this change will reduce the cost to the customer, improve production capabilities, and identify areas for further investigation and improvement. The challenges will be to develop a strong budget program that supports the garrison functions being funded and for the Organic Industrial Base. It will require the Department of the Army to address how special installations such as the depots and arsenals are funded to support garrison operations. Some of the Department of Defense instructions and guidance will have to be changed to encompass the way garrison functions are funded. It will require lobbying Congress to change legislation on how depots and arsenals fund their garrison operations, and finally it will require a changing mind-set of not only the Organic Industrial Base leadership, but also the leadership of the customers of the depots and arsenals.

While the implementation will be a challenge it is our recommendation that one or two of the Army's Organic Industrial Base depots or arsenals be selected for a test study to prove or disprove how separately funding the garrison operations will improve the operational effectiveness of the Organic Industrial Base. We further recommend that the test case for the installation or installations be monitored for at least one fiscal year, allowing the garrison to operate under the independent budget through the four seasons. During that same period of time the production side of the equation will not only look at the financial savings directly associated with removal of the garrison budget from the burdened labor rate but how they can reduce those indirect labor costs associated with production.

As part of the test case, the production operations of the depot or depots chosen would identify and track the cost savings being passed on to the customer(s), not only overall but by weapon systems that are going through their respective depot programs during the period of analysis. At the same time, the Garrison operations will also track and gauge Garrison operation costs in terms of labor and material. Because the depots and arsenals are special installations, the Garrison will also track how much of their facility and infrastructure work is depot operations related.

During this period of performance, it will be critical to receive feedback from the customers (PMs) on whether or not the change in costs will influence their future decisions on how to distribute workload based on the 50/50 share rule. The realization is that cost is not the only factor that influences a customer's decision so the depots will also have to show improvement in schedule and performance factors.

Our conclusion is that the funding changes suggested and the responsibilities being placed on depot management for dispersing funds will improve the depot efficiency, lower the cost to the customer, and improve garrison operations.

V. LIMITATIONS OF STUDY

Our study was limited to Anniston and Red River Army Depots, which provided us information on labor costs associated with Ground Combat Vehicle and Tactical Vehicle depot maintenance. It does not take into account aviation related depot maintenance, communications and electronics depot maintenance, or the arsenal operations that are all part of the Army's Organic Industrial Base. While our analysis concludes that separately funding garrison functions at Army Organic Industrial Base Facilities will reduce the burdened labor rate charged to the customer, data from other depots and the arsenals could potentially skew that data to the status quo.

We were further limited on the literature available on the subject. While there are several GAO reports concerning depot costs, there has not been an in-depth study of how the burden labor rate elements impact the cost to the customer. Other literature focused on the declining workloads, inconsistent budgets, and the aging work force not only in the Army's depots but also across the DoD. The focus of most of these reports has been on the efficiencies of the depot operations. While our research is not groundbreaking, we feel that it provides a different approach to addressing the burdened labor rate issue.

Another limitation to our study was the lack of historical data going back several years that could provide a basis for comparing pre-IMCOM activities on an installation to current IMCOM activities on the same installation. Historical data for the burdened labor rate tended to be scarce.

Even with the limitations that were encountered during the development of the hypothesis and research, we believe that this document can be the genesis for further investigation into the operational and garrison relationship at Army Special Installations.

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VI. AREAS FOR FURTHER RESEARCH

Further research is needed to determine if the separation of garrison functions and the workforce associated with garrison operations will lead to depot efficiencies in the areas of operations management, budgetary, performance, and effectively scheduling. These topic areas where not discussed in this paper. If a successful pilot study is implemented at one of the Army's depots, it is recommended that this effort be expanded to include the Army's Arsenals.

Further research is warranted with senior leadership to understand their requirements for a long-term change in the Army's Organic Industrial Base management. The current tour of duty for a depot or arsenal commander is two years. The officers selected to lead an Army Organic Industrial Base Depot or Arsenal usually come from soldier centric organizations with operational missions focused on combat arms, even in the support functions. They are thrust into an environment with little knowledge and training on how the industrial base operates where the workforce is overwhelmingly civilian and the mission is more production oriented. It normally takes a commander a significant amount of time before they become comfortable with the way the depot or arsenal operates. By the time they have their stride on the functioning of the industrial operation and are beginning to implement changes that will positively impact the operation, the Army is starting to select their follow-on assignment. Research is needed to determine if having a two-year tour of duty at an Army Organic Industrial Base installation is sufficient to foster the leadership necessary for long-term change or direction.

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APPENDIX

Title 10, U.S.C. Section 2208(j) Working Capital Funds (Subcontracting) (1991): The Secretary of a military department may authorize a working capital funded industrial facility of that department to manufacture or remanufacture articles and sell these articles, as well as manufacturing, remanufacturing, and engineering services provided by such facilities, to persons outside the Department of Defense.

Title 10, U.S.C. Section 4543 Authority to Sell Outside the Department of Defense (1993): Authorizes a working-capital funded Army industrial facility (including a Department of the Army arsenal) that manufactures large caliber cannons, gun mounts, recoil mechanisms, ammunition, munitions, or components thereof to sell manufactured articles or services to a person outside the Department of defense with some stipulations. The proceeds from such sales are returned to the Working Capital Fund rather than to the facility that made the sale.

Title 10 U.S.C. Section 2474 Centers of Industrial and Technical Excellence (CITE Statute) (1997): Grants authority to depots now designated "centers of industrial and technical excellence" in their respective core competencies to enter into partnerships with private industry. These partnerships offer unprecedented flexibility to the depots to perform subcontract work for private companies to use facilities or equipment at the depots for either military or commercial purposes. The subcontract work is related to the core competencies of the Center, including any depot-level maintenance and repair work that involves one or more core competencies of the Center. The objectives for exercising the authority to maximize the utilization of the capacity of a Center of Industrial Technical Excellence, reduce or eliminate the cost of ownership in such areas of responsibility as operations and maintenance and environmental remediation, and to reduce the cost of products of the Department of Defense produced or maintained at a Center.

Title 10 U.S.C. Section 2667 Enhanced Use Leases (2000): Creates incentives for both organic facilities and the private sector to negotiate long-term leases of public property in return for cash or in-kind investment in the facilities. The in-kind investment

includes maintenance, protection, alteration, repair, improvement, or restoration (including environmental restoration) of property or facilities. It can also include construction of new facilities, use of facilities, provision or payment of utility services and real property maintenance.

Title 10 U.S.C. Section 4544 Cooperative Activities Pilot Program (2004): Authorizes all working-capital funded Army industrial facilities (arsenals, ammunition plants, depots, or "a manufacturing plant") to enter into a variety of cooperative arrangements with "non-Army" entities. Cooperation can include direct sales or subcontracting by the Army facility, work share arrangements, and teaming to jointly bid on new federal contracts. The pilot program provides additional flexibility by allowing the Army facilities to inter into fixed-price and multi-year contracts to deliver goods and services, and allow the non-Army entity to make incremental and in-kind payments. This statute does not include any provisions for accounting for the proceeds of any of these cooperative arrangements.

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